



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/660,139	09/10/2003	Jing-Hsiang Hsu	JCLA9793	6888
23900	7590	03/29/2005	EXAMINER	
J C PATENTS, INC. 4 VENTURE, SUITE 250 IRVINE, CA 92618			LUM, LEON YUN BON	
			ART UNIT	PAPER NUMBER
			1641	

DATE MAILED: 03/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

116

Office Action Summary

Application No.

10/660,139

Applicant(s)

HSU ET AL

Examiner

Leon Y. Lum

Art Unit

1641

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 December 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-5 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-5 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. The amendment filed 23 December 2004 is acknowledged and has been entered.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. In claim 1, line 8, the phrase "the aminated surface of the silicon dioxide layer" is vague and confusing. Since lines 4-6 of the instant claim indicate that the silicon dioxide layer has been modified *into* an aminated surface, it is confusing as to how the aminated surface is *on* the silicon dioxide layer.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 1641

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 1 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nova et al (US 5,874,214) in view of Cozzette et al (US 5,063,081).

In the instant claims, Nova et al reference teaches a method that provides matrices with memories, wherein the matrix material can be used in peptide synthesis,

Art Unit: 1641

and wherein surface modification of the matrix material can be performed by introducing free amino or carboxyl groups onto a silica matrix (i.e. modify a surface into an animated surface) in order to attach biological molecules (i.e. performing a solid-phase peptide synthesis step to synthesize a peptide with a specific amino acid sequence).

See column 6, lines 54-65; and column 24, lines 13-38, especially lines 13-18. In addition, Nova et al reference teaches that the matrices can be encoded with a pre-programmed identifying bar code (i.e. providing a micro-carrier labeled with an identification code). See column 34, lines 1-3. Furthermore, Nova et al reference teaches that the matrix can be a silicon chip. See column 12, lines 47-63, especially line 62.

However, Nova et al reference fails to teach that the surface modification procedure comprises covering the surface of the micro-carrier with a silicon dioxide layer and reacting the silicon dioxide layer with 3-aminopropyltriethoxysilane.

Cozzette et al reference discloses a biosensor wherein a silicon substrate is layered with silicon dioxide, in order to provide a non-conductive layer, and further modified with a silane layer, wherein the silane is 3-aminopropyltriethoxysilane, in order to provide a semipermeable solid film that promotes adhesion of subsequent layers of other materials. See column 26, lines 4-12; column 29, line 62 to column 30, line 15 and Figures 1-2. Cozzette et al reference also teaches that a subsequent layer is a biolayer that incorporates a biologically active molecule that can be screen-printed or dispensed on the solid phase, wherein the biologically active molecule can be

Art Unit: 1641

polypeptides. See column 19, lines 33-45, especially lines 33-34 and 37; and column 39, lines 6-13 and Figure 2.

It would have been obvious at the time of the invention to modify the method of Nova et al with a biosensor wherein a silicon substrate is layered with silicon dioxide, as taught by Cozzette et al, in order to provide a non-conductive layer, and further modified with a silane layer, wherein the silane is 3-aminopropyltriethoxysilane, as taught by Cozzette et al, in order to provide a semipermeable solid film which promotes adhesion of subsequent layers of other materials, including a biolayer of polypeptides. One of ordinary skill in the art at the time of the invention would have reasonable expectation of success in modifying a biochip with silicon dioxide and 3-aminopropyltriethoxysilane, as taught by Cozzette et al, in the method of Nova et al, since Nova et al teaches matrix chips that can be made of silicon, and the silicon dioxide layer taught by Cozzette et al can be used to modify silicon surfaces.

With regards to claim 5, Nova et al reference teaches a bar code, as stated above. See column 34, lines 1-3

9. Claims 3-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nova et al (US 5,874,214) in view of Cozzette et al (US 5,063,081), as applied to claim 1 above, and further in view of Wu et al (US 5,922,161).

Nova et al and Cozzette et al references have been disclosed above and Nova et al reference additionally teaches that the matrix can be any solid support, including polymers. See column 12, lines 47-63, especially lines 54-56. However, Nova et al and

Art Unit: 1641

Cozzette et al references fail to teach that a material for forming the micro-carrier is a high molecular weight material or comprises polyethylene terephthalate (PET).

Wu et al reference discloses the polymeric materials of ultra high molecular weight polyethylene and polyethylene terephthalate, in order to provide materials that can be surface modified for adhesive bonding, coating, and biocompatibility. See column 3, line 57 to column 4, line 12; and column 2, line 63 to column 3, line 5. In addition, Wu et al reference teaches that the modified polymeric materials can be used for immobilization of biological materials. See column 10, lines 55-59.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Nova et al and Cozzette et al with polymeric materials of ultra high molecular weight polyethylene and polyethylene terephthalate, as taught by Wu et al in order to provide materials that can be surface modified for adhesive bonding, coating, and biocompatibility, wherein the modified polymeric materials can be used for immobilization of biological materials. One of ordinary skill in the art at the time of the invention would have reasonable expectation of success in using ultra high molecular weight polyethylene or polyethylene terephthalate, as taught by Wu et al, in the method of Nova et al and Cozzette et al, since Nova et al and Cozzette et al teach peptide synthesis on surface modified matrices that can be produced from polymers, and the ultra high molecular weight polyethylene or polyethylene terephthalate materials are types of polymers that can be surface modified for binding applications.

Response to Arguments

10. The following statements are made with respect to Applicant's arguments in the Remarks, filed on 23 December 2004.

11. On page 3 of the Remarks, Applicant indicates that claim 2 has been cancelled. The cancellation of claim 2 has therefore overcome the rejections under 35 USC 112 regarding the instant claim in the previous Office Action.

12. On pages 3-5 of the Remarks, Applicant argues that Cattell et al (US 6,180,351) reference does not anticipate claims 1 and 5. The Examiner has withdrawn the rejection under 35 USC 102(b) made in the previous Office Action with regards to Cattell et al reference.

13. On pages 5-7 of the Remarks, Applicant argues that Nova and Cozzette references "substantially fails to teach, suggest or disclose every features of the amended claim 1" (lines 13-14). Applicant also argues that Nova and Cozzette references "substantially fails to teach, suggest or disclose a method of forming a biochip comprising at least a step of forming covering a surface of the micro-carrier with a silicon dioxide layer and reacting the silicon dioxide layer with 3-aminopropyltriethoxysilane to modify a surface of the silicone dioxide later into an aminated surface as required by the amended claim 1" (lines 14-18). In addition,

Art Unit: 1641

Applicant refers to Figure 2 of Cozzette reference and points out the different layers of the figures as evidence that "Cozzette substantially fails to teach or disclose a step of forming the biolayer on the animated layer of the silicon dioxide layer which is formed by the reaction between the silicon dioxide layer and the 3-aminopropyltriethoxysilane".

Applicant's arguments have been fully considered but they are not persuasive. As stated in the rejection under 35 USC 103(a) supra, Nova et al reference teaches a silica matrix material that can be surface modified and used in peptide synthesis, which reads on the limitations of "providing a micro-carrier", "modify a surface into an animated surface", and "performing a solid-phase peptide synthesis step to synthesize a peptide with a specific amino acid sequence on the aminated surface". Cozzette et al reference has been combined with Nova et al reference to teach the remaining limitation of "covering a surface of the micro-carrier with a silicon dioxide layer and reacting the silicon dioxide layer with 3-aminopropyltriethoxysilane", by disclosing a silicon chip covered with a silicon dioxide layer and further modified with 3-aminopropyltriethoxysilane, also stated above. Applicant has pointed out that Figure 2 indicates "substrate (20), a non-conductive layer of silicon dioxide (15)... a permselective silane layer (6)" (page 6, line 19 to page 7, line 3 of the Remarks). Since Cozzette et al reference teaches that the silane layer (6) can be 3-aminopropyltriethoxysilane and since the silane layer is shown in Figure 2 to be on top of silicon dioxide layer (15), Cozzette et al reference does in fact provide teaching of modifying a silicon dioxide layer with 3-aminopropyltriethoxysilane, contrary to Applicant's arguments. In addition, biolayer (7) in Figure 2 can include polypeptides,

Art Unit: 1641

which indicates that the 3-aminopropyltriethoxysilane modified silicon dioxide layer is capable of retaining polypeptides, and provides evidence that Cozzette et al reference can be combined with Nova et al reference since Nova et al reference requires that the modified surface be able to provide for peptide synthesis.

Therefore, since Nova et al and Cozzette et al references have been described to fully teach each and every limitation of amended claim 1, Applicant's arguments with respect to amended claim 1 are not persuasive.

14. On pages 7-8 of the Remarks, Applicant argues that since claims 3-4 and 5 are dependent on claim 1, the instant claims are allowable based on patentability over Nova and Cozzette.

Since Nova et al and Cozzette et al references have been described to fully teach each and every limitation of amended claim 1, Applicant's arguments with respect to claims 3-4 and 5 are not persuasive.

Conclusion

15. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

Art Unit: 1641

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leon Y. Lum whose telephone number is (571) 272-2878. The examiner can normally be reached on 8:00am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Long Le can be reached on (571) 272-0823. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Leon Y Lum
Patent Examiner
Art Unit 1641


LYL


LONG V. LE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1600

03/16/05